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09/821,640

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06/06/2006

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EXAMINER

KANG, INSUN

ART UNIT

PAPER NUMBER

2193

DATE MAILED: 06/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|------------------------------------|--|
| Office Action Summary | Application No. 09/821,640 | Applicant(s) LUEH ET AL. | |
| | Examiner Insun Kang | Art Unit 2193 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 and 17-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 and 17-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is in response to the RCE amendment filed 3/6/2006.
2. As per applicant's request, claims 1-15 and 17-24 have been amended and claim 16 has been cancelled. Claims 1-15 and 17-24 are pending in the application.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-15 and 17-24 are rejected under 35 U.S.C. 102(e) as being anticipated by Ogasawara (US Patent 6,671,877).

Per claim 1:

Ogasawara discloses:

- storing native code associated with a first method within a native code space ("JITed codes are managed in memory," col 1 lines 50-57; "generates and stores into a storage a code for recording a method call which is actually issued," col 3 lines 10-45);
- creating a symbolic reference to the first method in a method table ("when compiling a method, a compiler creates a table of all target addresses...and affix it to a compile

code...an entry ...associated with an effective call set of a method called is updated,” col. 5 lines 39-60; col. 6 lines 40-63)

- determining whether the native code space exceeds a threshold in response to an invocation of a second method (“if a memory request of a JIT compiler cannot be met in a certain thread,” col 4 lines 8-21; col 1 lines 50-60; “utilizing ...execution time information a degree of how readily a nonactive method is called (an activity degree),” col 3 lines 52-65)
- incrementing method counters each time the first method or the second method is invoked, wherein the method counters correspond to the first method and the second method (i.e. col. 1 lines 51-57; col. 4 lines 8-26)
- unwinding a stack to determine whether the first method or the second method is active based on whether a corresponding method counter has exceeded a count threshold (i.e. col 4 lines 8-26 and 45-60; col. 6 lines 13-20)
- reclaiming the native code (“A JITed code discarding policy is “to discard JITed codes that are not expected to be used immediately.” It can be expected that a method of a low activity degree will not be called for a while. If [JI]Ted codes of methods not called for awhile are discarded, the amount of free memory used by them should be available for a long time,” col 4 lines 45-60) associated with the first method and compiling byte code into native code associated with the second method in response to determining that the second method is active(“an activity degree is allocated to all the methods, A JIT compiler discards JITed codes whose activities are lower...and continues compilation,” col 6 lines 64-67)

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- updating the method table for the first method to reference an appropriate symbolic reference (“when compiling a method, a compiler creates a table of all target addresses...and affix it to a compile code...an entry ...associated with an effective call set of a method called is updated,” col. 5 lines 39-60; col. 6 lines 40-63)

as claimed.

Per claim 2:

The rejection of claim 1 is incorporated, and further, Ogasawara discloses:

- reclaiming the native code associated with the first method in response to a determination that the native code space exceeds the threshold (“if a memory request of a JIT compiler cannot be met in a certain thread...based on such an activity degree, some or all of JITed codes of a nonactive method are discarded,” col 4 lines 8-21; col 1 lines 50-60)

as claimed.

Per claim 3:

The rejection of claim 2 is incorporated, and further, Ogasawara discloses:

- storing the native code associated with the second method within the native code space in response to the compilation(“a second method which has a high possibility that the second method is actually called from a first method corresponding to a stack frame is specified and stored into a storage by using the calling map and information concerning method calls which are actually issued for the first method,” col 3 lines 23-45)

as claimed.

Per claim 4:

The rejection of claim 2 is incorporated, and further, Ogasawara discloses:

-invoking the first method following the reclamation and re-compiling ...in response to the invocation of the first method (“A JIT compiler discards JITed codes whose activities are lower, restarts thread execution, and continues compilation,” col 6 lines 64-67; “discarding a code to be effectively selected, frequency of recompile of an identical method could successfully be lowered and compile overhead reduce,” col 7 lines 45-50; abstract) as claimed.

Per claim 5:

The rejection of claim 2 is incorporated, and further, Ogasawara discloses:

- compiling byte code into native code associated with the second method (col 4 lines 56-58; col 7 line 20) as claimed.

Per claim 6:

The rejection of claim 5 is incorporated, and further, Ogasawara discloses:

-compiling byte code into native code associated with the second method (“compilation by a JIT compiler,” col 4 lines 56-58)
as claimed.

Per claim 7:

The rejection of claim 2 is incorporated, and further, Ogasawara discloses:

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-determining whether the first method is active or inactive (“calculating an active degree of a method...is used to decide an activity degree of each method,” col 4 lines 8-21; “A JITed code discarding policy is “to discard JITed codes that are not expected to be used immediately.” It can be expected that a method of a low activity degree will not be called for a while,” col 4 lines 45-53)

-reclaiming the native code associated with the first method in response to a determination that the first method is inactive (...based on such an activity degree, some or all of JITed codes of a nonactive method are discarded,” col 4 lines 8-21)

as claimed.

Per claim 8:

The rejection of claim 7 is incorporated, and further, Ogasawara discloses:

-determining whether the first method is hot or cold in response to a determination that the first method is inactive (“calculating an active degree of a method...is used to decide an activity degree of each method,” col 4 lines 8-21; “A JITed code discarding policy is “to discard JITed codes that are not expected to be used immediately.” It can be expected that a method of a low activity degree will not be called for a while,” col 4 lines 45-53)

-reclaiming the native code associated with the first method in response to a determination that the first method is inactive comprises reclaiming the native code associated with the first method in response to a determination that the first method is cold(...based on such an activity degree, some or all of JITed codes of a nonactive method are discarded,” col 4 lines 8-21)

as claimed.

Per claims 9-15, they are the machine-readable medium versions of claims 1-8, respectively, and are rejected for the same reasons set forth in connection with the rejection of claims 1-8 above.

Per claims 17-24, they are the data processing system versions of claims 1-8, respectively, and are rejected for the same reasons set forth in connection with the rejection of claims 1-8 above.

Response to Arguments

5. Applicant's arguments filed 3/6/2006 have been fully considered but they are not persuasive.

Per claims 1, 9, and 17:

The applicant states that Ogasawara does not teach or reasonably suggest incrementing method counters each time...based on whether a corresponding method counter has exceeded a count threshold.”

In response, the count heuristic to track execution frequency is a well-known technique in the pertinent art at the time the invention was made. A counter of a method is increased every time the method is called to collect execution frequency of the method. Furthermore, the applicant acknowledged in page 11 that “Ogasawara discloses that “a method is compiled by a JIT compiler if it is determined that it is executed more than a certain level in terms of execution frequency or execution time. Once generated, JITed codes are managed in memory.” Ogasawara sets “an upper limit” to frequency of operation for the activity degrees of methods (col. 4 lines 22-26). Therefore, applicant’s statement that Ogasawara does not disclose

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incrementing method counters...has exceeded a count threshold” is not persuasive. Accordingly, the rejections of claims 1, 9, and 17 are considered proper and maintained.

Per claims 2-8, 10-15, and 18-24:

The applicant states that claims 2-8, 10-15, and 18-24 are allowable as being dependent on the allowable base claims. As has been shown above, the rejection of the independent claims by Ogasawara is proper, the argument that claims 2-8, 10-15, and 18-24 are allowable as being dependent on the allowable base claims is considered moot. Accordingly, the rejections of claims 2-8, 10-15, and 18-24 are considered proper.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Insun Kang whose telephone number is 571-272-3724. The examiner can normally be reached on M-F 7:30-4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kakali Chaki can be reached on 571-272-3719. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Any inquiry of a general nature or relating to the status of this application should be directed to the TC 2100 Group receptionist: 571-272-2100.

I. Kang
Examiner



WEI ZHEN
SUPERVISORY PATENT EXAMINER